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The Blessed Land: Internalization of Past Disaster into Culture

by Sangihe's Coastal Community

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Abstract— This paper explores how the coastal community of Sangihe Island, North Sulawesi, Indonesia adapted from past disasters through internalization of bad memories. To build an understanding of the cultural construction of this adaptation, this paper uses a cultural ecology framework and information collected through phenomenological study to identify the primary socio-historical information derived from past disaster. The results of the research show that the community has internalized the memories of disaster through material and non-material culture, as well as spatial arrangements of infrastructure to address the multiple threat of volcanic eruption, tsunami and typhoon risks, witnessed by their ancestors. This paper shows that the community of Sangihe apply an embedded knowledge and experience into daily practices. This is one of the models of indigenous knowledge-based disaster risk reduction which can be a foundation for the present generations outside Sangihe to minimize the impact of disasters.

Keywords— *Coastal community, cultural adaptation, disaster, indigenous knowledge, internalization.*

INTRODUCTION

Indonesia is well-known as one of the most disaster-prone regions in the world, situated on the Pacific 'Ring of Fire' where three active tectonic plates intersect. Much attention has been given to disaster events in mainland Sumatera and Java where these frequently impact upon millions of people living in dense populations. In the decade after Aceh's tsunami in 2004, Jogjakarta experienced an earthquake in 2006 (Rakhman & Kuswardani, 2012) and West Sumatera's suffered another earthquake in 2009 (Anwar, 2012). Little thought was given to the fact that disasters also hit less populated regions of Indonesia such as Sulawesi. This changed in 2018 when a tsunami and liquefaction event had a catastrophic and fatal impact on Central Sulawesi (Wekke *et al.*, 2019).

Sulawesi has long experienced the threat of disasters from by geological (van Gorsel 2018) and hydro-meteorological sources. The conjunction of three tectonic plates (Indo-Australia, Eurasia, and Pacific) both forms the land of Sulawesi and makes it disaster-prone (van Bemmelen 1949). In addition, Sulawesi's position in the open sea adjacent the Banda Sea, Sulawesi Sea in the western Pacific Ocean is in the path of typhoons and open to tsunami. Tectonic development on the island of Sulawesi has been active since the Tertiary Period. The island of Sulawesi is one of the most geologically active regions in Indonesia and has a complex geological phenomenon. Because of this land formation processes are not yet stable and underwater volcanic activity is still ongoing. In consequence the disaster risk in Sulawesi and Sangihe is quite high (Kaharuddin *et al.*, 2001).

In short, Sulawesi is home to volcanoes, earthquake, liquefaction and storms, and indicated as a “Red Zone” by Indonesian National Disaster Management Agency. This indicates it is a high-risk area with complex disasters (BNPB 2016). Over time the lack of historical literacy has led people to ignore the massive threats Sulawesi faces. But in one small corner of Indonesia, an island situated off the Sulawesi mainland and a part of North Sulawesi Province lies the Island of Sangihe (Sangir) where valuable practices and lessons on how to remember the disaster events can be found. The people of Sangihe have internalized the past into their daily life, including how to deal with future risk. Similar capacities to face disasters have been revealed in the coastal community on Ruang Island, Regency of Siau (Rampengan *et al.*, 2014; Rampengan, 2015). In these communities’ disasters, climate change, agroforestry, and livelihood are combined in the adaptive capacity of the small island community.

This paper will describe the process of internalization by the coastal community of Sangihe and show how their remembrance of disasters is internalized and how this in turn affects their daily lives with particular regard the closest disaster vector. The locus of exploration is the community of Kendahe, situated on the north of Sangihe Island. This community is surrounded by the Sulawesi Sea and the Pacific Ocean and is home to a myth relating to a catastrophe which occurred more than three hundred years ago. This paper intends enrich the literature on indigenous knowledge disaster risk reduction (Syafwina, 2014; Trinirmalaningrum, 2015; Rahman, 2017; Zulfadrim *et al.*, 2019) and to contribute to research themes about the technical aspects of institutionalized governance of disaster risk assessment, disaster risk reduction and climate change (Djalante, 2018).

METHOD

This research uses a phenomenology study which explores the inter-relationship between material facts and the development of meaning for each material object. To get sufficient data, phenomenology research uses various sources of information including literature, myth or folklore, historical stories, and in-depth interviews with relevant informants. The results of the first-hand information are then triangulated with observations and fact-finding. The next step is using the framework of the cultural ecology approach described above to shape all the findings into a systematic analysis.

Phenomenology is concerned with people as active creators of social reality (Ritzer, 2001). The method is used to find the symptoms or traces of a set of human experience and knowledge of an object (Johnson, 2008). This method stems from the conception that human consciousness arises from the context of an individual’s world (the person in context) and inter-subjectivity between shared roles and the over-lapping between actions in the universe (Husserl in Smith *et al.*, 2009). With the phenomenology method, researchers make reductions on knowledge, which are considered as given by the subjects. The method results in the reduction of the experiences of many subjects into their core and essence to build an explanation that interconnects the data. The focus of this study is to look at the artefacts and the meaning given to the artefacts by individuals and the community collectively. In short, phenomenology talks about awareness and how we perceive and understand phenomena. Rationalizations and arguments are not the focus but rather the meaning and awareness signified by the presence of objects, as worldly materials realities (McPhail, 1995).

As a qualitative research, this study analyzes reality subjectively, the reality as seen by the study's participants (Lincoln & Guba, 2002). Therefore, the research was carried out in a natural setting to explore lived experiences, myths, stories or traces of other local knowledge in Kendahe as a legacy of the past. This research also aims to weave the value and meaning of the subjective realities into a series of measured realities as through the mutual simultaneous process and triangulation (Creswell, 1994).

The Map of Sangihe Island

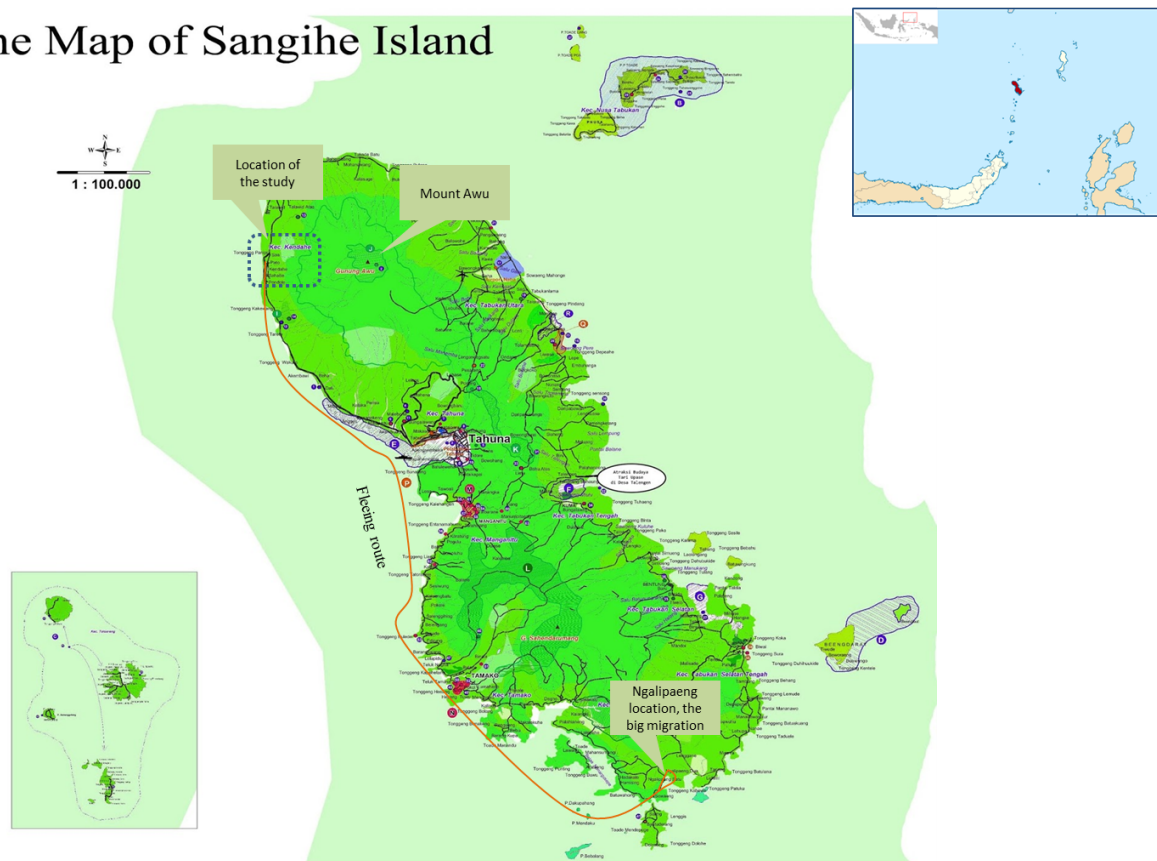


Figure 1. Map of Sangihe Island and location of study (sources: nirwanasangihe.com and wikipedia.org)

RESULT AND DISCUSSION

The internalization process: indigenous knowledge, adaptation and resilience

The concept of “internalization” has a strong connection with Mead’s Social Behaviorism which highlights a close relationship between social interaction and subjective mental processes, as well as the way individual’s self-concept link them with the life of the larger community or society (Johnson, 2008). According to Berger and Luckman (1966) there is a mutual relationship between human action, social institutions, and subjective consciousness. One principal in this relationship is internalization which occurs when people are socialized into their culture to develop a basic understanding of “the way things are” and “the way things should be.” When successful, the understanding becomes deeply embedded in subjective consciousness and accepted as everyday ‘common sense’ (Johnson, 2008). We will show that this kind of process occurs in the Sangihe coastal community where the memory of past disasters, constructed with new meanings and perceptions generates responses to the historic experiences, including some that appear contradictory, but over time have become embedded in the culture and minds of individuals (Zittoun & Gillespie, 2015). As a community with an

embedded culture and history, Kendahe's community refused to get away from source of disaster after 1711 but they chose to stay with the risk and build new a consciousness of adaptation to that risk. These practices then materialized into a new 'knowledge' related to their ecological circumstances then as a foundation for ecological resilience.

Indigenous or traditional ecological knowledge is defined as the set of knowledge and beliefs about the relationship between living beings and the environment handed down from one generation to the next through cultural transmission (Gadgil *et al.*, 1993). According to Shaw *et al.* (2008) indigenous knowledge practiced and rooted in local is genuine, developed over several generations, subject to adaptation and embedded in a community as way of life as a means of survival. Local knowledge can be easily adopted and used by communities, is dynamic and continuously influenced by the creativity, experience and practices of the communities. Traditional knowledge born from the local cultures learning of the processes and functions of nature exist in almost all types of communities within their framework for dealing with and adapting to the environment (Subramanian & Pisupati, 2010). Traditional knowledge surfaces in fragments, is based on observations and accumulates slowly and is limited to a certain geographic scope. Therefore, it can be said that traditional knowledge is a reflection of the world view of the community. This world view also contains a system of moral and magical beliefs which rest comfortably with knowledge and practices, as the corpus of traditional knowledge (Theodory, 2016).

This indigenous knowledge is now acknowledged by disaster practitioners, scientists and policy makers in the disaster risk reduction field, particularly after 2004 Indian Ocean's quake and tsunami (Meyers & Watson, 2008; Hiwasaki *et al.*, 2014). The well-known "smong" revealed the traditional knowledge that has ability to save life at practical ways. However, it tooks tens of years after 1907's tsunami for this knowledge to be maintained and to appear again at 2014 and finally acknowledged by wider communities (Rahman, 2017; Rahman *et al.* 2017). Unfortunately, the external interference, a new and modernizing model of development in some cases suppress these kinds of local long-accumulated knowledge. Nevertheless, the lately cultural movement appears to kick back the hazards using this local knowledge like in Sulawesi (Irawan, 2018), Mentawai Island (Dungey and Rodway, 2017) or Nias Island (Trinirmalaningrum, 2015).

According to Holling (1973) ecological resilience has two meanings; the ability to return to a stable earlier condition, and the capacity of a system to absorb perturbation temporarily while maintaining the population and same state variables (Cote 2012). For Walker *et al.* (2004) resilience is defined as the capacity of a system to mitigate disruptions and reorganize such that shocks do not change the function, structure, identity and feedbacks of the system (Folke 2006). This is in line with the definition of Adger (2000) that resilience is the ability of a community to adapt to external changes (Berkas *et al.* 2006). This adaptive ability will determine how strong a community is in facing and overcoming a shock. Resilience is closely related to the concept of adaptation. According to Folke (2010) there are three aspects to the formation of socio-economic resilience. The first aspect is "persistence"; the ability to maintain performance even during a phase of change. The second aspect is the adaptability of human capacity in a socio-economic system, and the third aspect is transformability as a measure of the human capacity within a specific socio-economic system to create a new system replacing the old ecological, political, social relations that are no longer viable (Holling 1973; Walker *et al.*, 2004; Folke, 2010).

The relation between cultural internalization and the construction of indigenous knowledge about risk above is congruent with Steward's (1955) conception of on cultural ecology. In Steward's concept, the community makes cultural changes and modifications driven by adaptation to the environment. Here it appears that the relationship between society and the natural environment is absolute because, in his consideration, nature determines the way a community lives. In this view all forms of beliefs, views of nature and traditional knowledge accommodate the changes or dynamics of environmental conditions, including social, economic and historical interactions, which are considered as mutual relationships between the components of organic, inorganic and socio-culture (Gunn, 1980).

Cultural ecology examines the interrelationship between the biological environment and humans or between human as biological animal with the ecosystems consisting of water, soil, air, living organisms and the physical structures built by humans (Marten, 2001). Applying this approach to qualitative research, researchers seek to shed light on the symptoms and the causal relationships that take place in the socio-ecological system in order to build a human-security system within a certain region. This study will also include socio-ecological dynamics underlying the process of human survival when faced natural hazards (Dharmawan, 2007). This is consistent with Oliver-Smith's statement that "disaster is a symptomatic of the condition of a society's total adaptational strategy within its social, economic, modified and build's environment" (Oliver-Smith, 1999:25). In this sense when disasters occur, they reveal and become an expression of the complex interactions of physical, biological, and sociocultural systems as a total. Thus, the anthropological research comes with an opportunity to amalgamate past and current cultural, ecological, and political-economic investigations, along with archaeological, historical, or demographic concern in creating behavioral response and social change approach (Oliver-Smith 1996).

Using the concept and framework of Steward's cultural ecology, the culture area is a construct of behavioral uniformity which occur within an area of environmental uniformities, that means, culture and nature in general is coterminous because culture can be regarded as a result of adaptation to a particular environment (Steward, 1955:35). Between the physical environment and human activities there is always a middle ground which includes values and objectives as well as the construction of a body of knowledge and belief systems, in short: cultural patterns. Patterns of culture are not static but always adaptable and modifiable in relation to the physical environmental conditions obtained through discovery, innovation and creativity of the community. Multi-linear evolution was conceived of as a process of adaptation which advances along several lines diverging from a common source (White, 1957). In Steward's concept the lines seem diversified and separated. However, in context of Sangihe we will see that there is a common source of adaptation and a unity of origin.

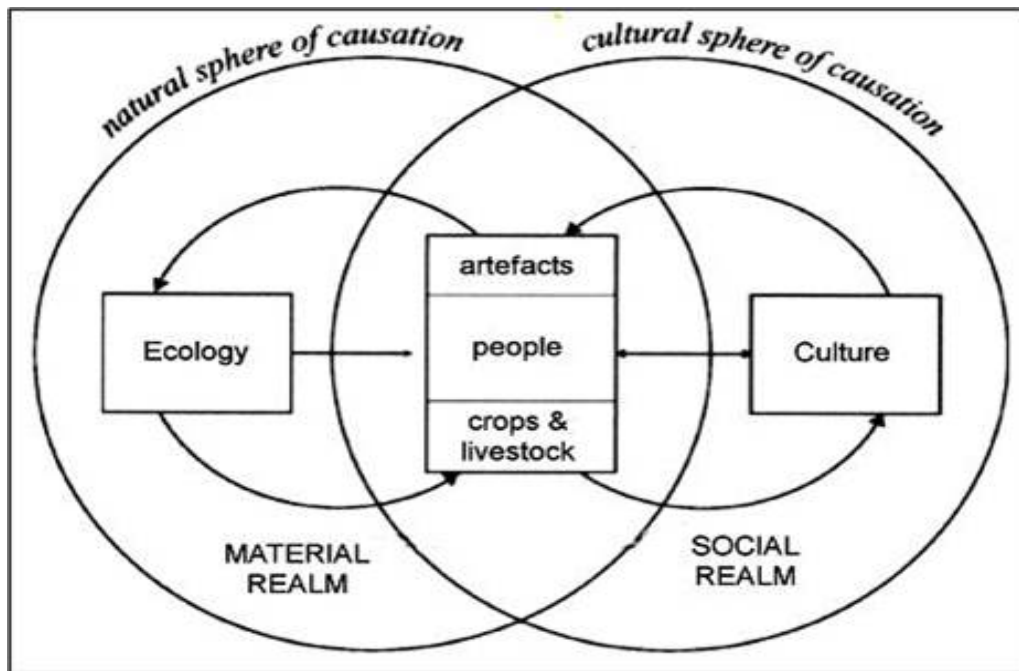


Figure 2. Cultural pattern in the adaptation process (source: Kowalski & Weisz, 2006)

Figure 2 shows that the environmental aspects are not the causal or determinant factor, rather environment or nature imposes limits on the range of adaptation. Herskovits (1949:163) stated that habitat is a factor that limits behaviors; humans not only adapt to nature reactively but also build their adaptation beyond the requirements of their habitat which enables them to face the challenges within the existing limitations (Freilich, 1967). So, adaptation can be said to be a negotiation between the human system (culture) and the limitations of nature (Thornton *et al.*, 2019). In this circumstances people must calculate their ability to maintain livelihood and social systems, maintain food production systems and construct their technology, innovation and knowledge within the realistic limits set by nature, which includes natural hazards.

According to UNISDR (2009) adaptation is the adjustment of natural or human systems in response to actual or expected climatic (or disaster) stimuli or their effects, which moderates harm or exploits beneficial opportunities. Following the cultural ecology framework adaptation should not be considered a short term or accidental effort but a deliberate action through a conscious process which includes the need of policy response (Schipper, 2007). This is in the same sense with Adger *et al.* (2005:78) which state that “adaptations are not isolated from other decisions but occur in the context of demographic, cultural and economic change as well as transformations in information technologies, global governance, social conventions and the globalizing flows of capital.” There are four aspects to retrofit the adaptation concept into cultural ecology: the understanding of the cultures of climate or disaster trends, attention to everyday practices, scale in space and time of the individual - household to global and time scale between now and the past, and lastly, more-than-human approaches go with the new ecology including the importance of social and cultural history and heterogeneity within them (Head 2010). At the local level adaptability can be influenced by many factors such as managerial ability, financial access, technological and information resources, infrastructure, the institutional environment political influence, kinship networks, and so on (Smit & Wandel, 2006).

Indicators of adaptation are hard to define due to ‘the uncertainties of the science until that point’ (Barnett, 2001). Measurement of adaptation also wide and complex as it includes biophysical, built-environmental, and socio-economic aspects (Shim & Kim, 2015). The strongest point arising from this wide area of discussion is that the direct effect of adaptation is to reduce social vulnerability (Adger *et al.*, 2004) as vulnerability can be defined as the inability of individuals and social groups to respond to, in the sense of cope with, recover from or to adapt with any external stress placed on their livelihoods and well-being (Adger, 2000). Therefore, for the purpose of the study, discussion of adaptation will be based on cultural and ecological practices under a framework of cultural ecology about how communities learn from their environment and internalize it into their culture, disaster risk reduction strategies.

Steward (1955) argues that the relationship between humans and nature is determined by culture. Culture itself consists of two elements: culture core and non-culture core. In culture core, technology and environment influence the relationship with environment to a certain extent, but not completely because there are other elements creating cultural complexity such as: language, production, tenure, and division of labor (Lapka *et al.*, 2012). The weight of interaction between the two layers will be manifested in more practical form as institutions (law, norms), daily practices (distribution, exchange) and symbol (myths, moral, ethics). Steward’s cultural ecology ascertains the technology and material practices of subsistence that define a given culture core and involves the study of the relationship of technology used in subsistence production to the environment.

In Kendahe some forms of adaptation in practical daily lives of community have been identified with at least three categories of internalization of memories of disaster: material culture including artefacts, economic arrangements and land use, and non-material culture including language and folklores and infrastructure including the spatial arrangement of housing and roads.

Disaster in myth and fact

Sangihe Island was once an important commercial hub due to its strategic position in the middle of the navigation lanes of the spice trade from China, Philippines and Maluku. It was part of the spice-rich kingdom of Ternate in 16th-17th centuries (Ulaen, 2003). In the colonial era the same shipping lanes were used by European nations, the Portuguese, Spanish and Dutch venturing into area for spices from Halmahera and the Moluccas islands in the 18th-19th centuries. Commodities traded on Sangihe include coconut oil, cloves, groundnuts, and nutmeg. The situation changed when Sangihe Island became part of the administrative area of Manado, North Sulawesi. Originally one of the region’s central islands and an important port of trade, Sangihe was relegated to the periphery of the Manado administration. Sangihe subsequently retreated to become ‘just one of the islands on the border’ and was no longer considered vital to the inter-island trading passing through the archipelago (Lapian, 2014).

According the myth and legend of the community of Kendahe village at the northern end of Sangihe one catastrophic event occurred in 1711 in which three kinds of disasters struck at once: the great eruption of Awu, an earthquake and tsunami which submerged the royal palace, and a great typhoon that crushed the city. This catastrophe ended with the seismic collapse of Maselihe cape where the palace of the ancient Kendahe Kingdom

sank to the seabed and approximately 2030 to 3000 lives were lost. This legend is related to two other stories: the legend of the Bakeng Giant and the story of the King of Kendahe who precipitated the disaster.

The Bakeng Giant story is a legend related to the genealogy of Mount Awu and tells of a giant who swore revenge on the human who had tricked him into eating his own daughter¹. The second tale is the folklore that explains the cause of the catastrophe as the incest practice committed by the king with his own daughter². These two stories, both part of the folkloric legends of Sangihe, have the same message; Sangihe has experienced of great catastrophe in the past and has the potential in the future. In short, the people of Sangihe are living in a dangerous area.

Historic records support the folklore references; van Padang (1983) states that:

“at 10-16 December 1711, the whole mountain looked as a field of fire and enormous explosions were heard, followed by streams of burning water (hot mudflow). In Candahar (Kendahe at present.ed) at the east foot of the volcano no house remained intact. Number of fatalities was 2030 by the heat of fire followed by ash and stone eruption.”

What van Padang reported was based on “Journal of Taboecan” published by Valentijn (1724). Taboecan was one of the kingdoms of Sangihe Island at that time. The journal does not mention the tsunami or great typhoon that Kendahe’s locals believe also occurred. After 1711, Awu has continued to erupt regularly led to fatal consequences:

Table 1. Fatalities due to Awu Volcano eruption 1711-2014

Year of eruption	Number of human fatalities
1711	2030 - 3000
1812	963
1822	3200
1856	1856
1892	1532
1966	39
2004	no fatalities
2014	no fatalities

In total since 1711 eruptions of Mount Awu have caused a total of 11048 fatalities (Bani *et al.*, 2012). The accurate details regarding the true events are still swinging between myth and fact, but the moral of the story remains the same.

Amongst all disaster events in Sangihe, the 1711 catastrophe had the biggest impact on local’s memory. The 1711 disasters drove a great displacement: between 1712 and 1757 people moved from the original settlements

¹ Bakeng Giant legend is related to the genealogy of Mount Awu. The giant’s wife once lived together with humans who were the giant’s prey. One day a young girl named Niabai was kidnapped by the giant in order to eat her. Naibai’s brothers sought to rescue her. They saved Naibai and cooked the giant’s daughter to replace their sister for the giant wife. When the giant realized that he had eaten his own daughter, he was furious and chased Naibai and her brothers. During the chase the giant fell from a bridge, previously destroyed by the brothers, and landed on sharp stakes. Before he died, the Bakeng Giant swore a curse “Our blood will be a wave of fire, our breath will become a typhoon and our flesh will be a great pile of ashes.” The dead giant then became the Awu Volcano which always produces smoke from its crater. (This story was told by elders and head of village of Kendahe during the field research and is also reported in Nebarth *et al.*, (1985) and Makassar (2011).

² As told by elders of Kendahe and also found in Widiyanto, (2012)

in Maselihe peninsula to Ngalipaeng (South tip of Sangihe Island). The whole civilization and culture moved into new areas. This diaspora is considered a dark period because people were forced to flee their homeland and all its cultural associations. The experience created a terrible memory for the community and since then, people have re-read their history of disasters and changed their way of life (Sasiang, 2009; Makassar, 2011).

Nearly fifty years later, in 1757 the kingdom's capital was moved back to their homeland, just 4 km away from the previous location of the palace in Maselihe which was devastated by the tsunami, typhoon and volcanic eruptions in December 1711. The new capital was built at the marker point called the *Batu Limunggi* (Limunggi Rock) named from a stone thrown by the eruption of Awu (*batu limunggi* in Sangihe language means "the rolled stone"). This rock is a marker of the events they had experienced decades earlier.

In the area around the rock, new settlements grew. The area is called *Malingaheng* (which in Sangihe language means "dry land"). The name is also a marker referring to the tsunami that once flooded the coastal region, it is a remembrance that the new place was dry when the water finally receded. This location was seen as a gift from the *Ghenggonalangi* (the divine spirit), which in *Sasahara Sangihe* (Sangihe high language) is called *Kakendage* (meaning "compassion" or "place awarded by the love of the Almighty"). "Kakendage" then became the name of the village where the kingdom was rebuilt "on the blessed land".

The legacy of experiences, beliefs and persistent hazards has driven the community to maintain knowledge memories, tools for preserving the lesson of the past. But the information is never in a systematically documented form. This project identified that with verification, those bits of history still exist in the form of material culture, non-material culture, and spatial arrangement. The storytelling of the elders reaffirms the messages and meanings of those artefacts.

Material Culture (land use arrangement and artifacts)

The main occupations of the people of Kendahe are farmers of coconut, nutmeg, and cloves. Additional income comes from working as fishers, government staff, and retailers/small businesses. Kendahe farming communities produce nutmeg, cloves and coconut through simple natural techniques relying on the rich volcanic soil and abundance of water. They do not use chemical fertilizers for the major crops because the land is so fertile. Some fertilizers are made by burning leaves from their plots or mulching. Chemical fertilizers are only used in the house yard and in the government agricultural service program.

In addition to basing their economy on cropping, Kendahe exhibits another traditional economic practice in Kendahe which contributes to disaster preparedness. This is the use of land based on the principle of mutual support and mutual preservation of the area. In Kendahe, people's economic capacity is relatively equal; differences between families are not perceptible. To control assets (land), there are particular mechanisms to support the protection of people's economic life, which has been passed down for generations. These are: a) Each community member is allowed to clear land and work on that land provided that the land be registered to the government and authorizing the government as guardians on behalf of the owner.; b) The transfer of ownership of land is limited to relatives or fellow citizens of Kendahe only; c) Community members can exchange tree stands (e.g. coconuts) for other needs/goods (e.g. clothing) with other members of the community; and d) A practice of lending land from one community member to another is common. When one of the

community members has no livelihood, a landowner may lend their land for cultivation with the ‘cost’ being paid back with profits from product sold, not by rent. This is kind of arrangement of collective management over private land keeps their food supplies secure and contributes to the maintenance of social cohesion.

Kendahe community’s mechanisms for controlling livelihood and land tenure have remained intact over a long period where the economic situation is relatively good and there have been no damaging crises such that the community still believe that they are living on a ‘blessed land’. This system and belief also contribute to the generation of social capital in Kendahe.

Elements of Kendahe’s material cultures also maintains links to the catastrophe. This includes naming of some artifacts as guardian symbols for the collective memory. This includes a) the already-mentioned *Batu Limunggi* (‘Lumunggi Rock’). This large rock is situated in the middle of the settlement in Kendahe. *Batu Limunggi* Rock means “rolled stone” and refers to the transport of the rock from the Awu volcano during its 1711 eruption; b) Tree of *Bitung* or *Barringtonia spicata*. *Bitung* is originally a seaside plant but in Kendahe, the species grows in areas with an altitude of 200 meters asl. It is believed that an enormous wave in 1711 swept tree stems to the Bio Hills where they now grow ‘out of place’ as a reminder of the disaster; c) Awu Volcano means “Ash Volcano” or what is left of the mountain. Then Awu volcano is now just a fraction of its former glory, a reminder of a past major eruption and the warning for future.; d) Ngalipaeng (*Nengaring pai* in Sangihe means "move there") Ngalipaeng is the place (located on south tip of Sangihe Island) where the surviving citizens of the kingdom Maselihe fled the 1711 disaster and stayed for 46 years. This name is a reminder of the big migration; and e) The name of the village “Kendahe” itself has meaning. It is the location of the settlement for people moving back from Ngalipaeng. Another way of saying “Kendahe” is “Kendage” which comes from the word meaning “compassion” or in another form “Kakendage” which means love and affection. Since their return in 1757 people have always interpreted Kendahe as a blessed land. The moral of the folklore and the story behind these place names has become a mechanism to encourage everyone to remember the history of disasters on their land.

Non-material culture (Local terms and toponyms)

S.J. Esser in *Atlas voor Tropisch Nederland* (1938) identifies the Sangir language as a branch of Austronesian or Polynesian/Malay which entered the region about 1600 BC (Bellwood, 2017). This language is on the same branch with groups of Philippines’s languages but with no tradition of writing until the contact with the Western sailors that brought Latin Alphabet. There is no Sangirese alphabet ever found (Nebarth *et al.*, 1985).

A review of Sangirese indicates that a long time before the existence of internationally recognized for natural hazards the Sangihe community already had a specific local term for each major hazard (see Table 1). This indicates that the knowledge of hazards has long been rooted in Sangihe’s daily conversations and sets out their understanding their risky circumstances. These terms are still being used today. Table 2 sets out terms for each hazard in English, Indonesian, and Sangirese:

Table 2. Name of “disaster event” in Indonesian and Sangirese

No	Indonesian	Sangirese	English
1	<i>Puting beliung</i>	<i>Limpuruse</i>	Typhoon
2	<i>Tsunami</i>	<i>Luak dalulung</i>	Tsunami
3	<i>Gempa bumi</i>	<i>Linohe</i>	Earthquake
4	<i>Gunung meletus</i>	<i>Menopak</i>	Eruption
5	<i>Banjir</i>	<i>Lebah</i>	Flood
6	<i>Longsor</i>	<i>Teneke</i>	Landslide
7	<i>Badai siklon</i>	<i>Luakbaru</i>	Cyclone

Consistent with Steward’s concept of cultural ecology, every message, moral, ethical and other mechanism of collective education and dissemination of information can operate easier with appropriate language to build a culture base embedding the environment into their institutions. The folklore, myth, legends and any other historical values can be transmitted from generation to generation through language. This practice can be considered as the maintaining indigenous knowledge regarding hazards which always threat their space.

Practical Adaptation (on settlement pattern and evacuation routes)

The arrangement of village roads and settlements in the Kendahe study area showed a pattern of practical cultural adaptation in regard to mitigating the environmental risks surrounding the communities. In Kendahe there are areas where building any settlement is forbidden even though the area has fertile soil, is flat and has abundant water. These areas are set aside based on the knowledge that during the Awu eruption of 1711 and subsequently, these areas were the path of hot lava flows. Since the eruption the area has only ever been used for coconut and nutmeg plantation.

After the Kendahe people returned from evacuation in Ngalipaeng, they constructed roads symmetrically in straight lines connecting the coast and mountains. No major roads were made parallel to the shoreline (except shortcuts). This was intended to establish emergency paths (evacuation routes) in case of eruption of Awu and tsunami from the beach. This pattern has been altered somewhat since 1982 with new roads built parallel to the shoreline by the Ministry of Public Works.



Figure 3. Easy access from the residential area on upper to coast in case of Eruption (left) and easy access to Bio Hill in case of a tsunami in Soa (right) (sources: yoppie christian).

Kendahe's first original settlement was in Soa ("soa" meaning "settlements") and the location was selected as being the safest area from Awu threat. This was because it is situated with the Bio Hill presenting a shield or natural fortress between the village and the volcano. An alternative path to the beach is available here and Soa settlement also has a forested area for temporary evacuation. When Awu erupted in 1966 and 2004, many residents fled by sea to Tahuna (capital of Sangihe Island) via this path.

The current types of houses in Kendahe no longer use the original design and materials of Sangihe. In the past, the houses in Sangihe are built on stilts. Currently, 'semi-permanent' houses are built using modern materials of concrete or brick (Ulaen, 2003). Nevertheless, some important lessons of the past are not forgotten and are included in the design. One main example is that the main doors face south, north or east, away from the ocean. Locals recommended not to set the main door facing directly toward the ocean because it is believed that it will bring bad luck. In fact, it is a practical measure designed which avoid the effect of hard winds from sea. But also has a most practical function in that the main door always directly faces the road. The main door must not be obstructed by other buildings which is a mechanism to ensure that the residents can evacuate immediately by the main road should a disaster come.

The combination of main doors facing north or south towards the road, and roads leading via the shortest path from the sea in the west to the mountains in the east, aids disaster risk reduction by establishing the easiest routes for people to evacuate during emergency situations. Should there be a strong wind from the sea, the wind will not directly hit the houses, and should a tsunami arise people will immediately evacuate to the high ground following the main road. Likewise, should Awu threaten, people can easily evacuate towards the coast in a relatively short time.



Figure 4. Pattern of settlement and road in Kendahe: the aerial view from googleearth.com (left); schematic figure of the main road of Kendahe (right) (adapted from googleearth.com, 06 July 2020).

Figure 4 shows that the traditional roads are straight, connecting hills and coastline through the center of the settlement, whose doors are directly facing the roads. It is very useful to get quick evacuation due to both hazard, eruption and tsunami. But in 1982 a government project for making shortcuts connecting settlement with

one another began constructing roads parallel with coastline, and eventually led the changes on the spatial housing arrangement. These works ignored the local wisdom that had been maintained by community for centuries. But in Soa (the first settlement) no new roads have been constructed which run parallel to the sea, such that the old path style has been kept, even added to with evacuation areas in the vegetated land

CONCLUSION

From the examples shown above, the citizens of Kendahe have for hundreds of years applied a creative adaptation program in building resilience by internalizing the memory of past disasters into their cultures. First indicator found through no loss of collective memory and even further, enhancing memory reproduction in the form of myth, folklore, and legends about the catastrophe in 1711. The return of the community in 1757 and the rebuilding of settlements that take into account the risk of disaster is an example of one early form of resilience. Second, one case of the independent recovery after Awu's eruption 1966 indicates the social strength of Kendahe's community has been developed. After forced displacement to Bolaang Mongondow (mainland of Sulawesi) at 1966, most people chose to return and rebuild the village within a year. Following this event, the community were quickly able to recover all their aspects of their lives. In the case of the eruption of 2004, the evacuation was conducted earlier and over a shorter period, with no social system disruption. The third indicator, the overall learning process has produced a creative and unique adaptation for a community that constantly lives on the edge of danger. They have a mechanism for maintaining their ecological adaptation that runs effectively to this day.

The internalization process of experiences and memories of past disasters has been going for generations and maintained in a several forms: First, the identification of some hazards into local language. This is the oldest form of artefact that Sangihe's community aware what kind of hazards nearly existing around them from centuries to present and future. Secondly, through myths and legend the cultural message about past disaster internalized in the mind of all member of community and affecting the social behavior of community, inherited from generation to generation. Thirdly, the place naming (toponym) is bridging the myths and reality, reminds the member of the community that the disaster is really occurred in the past and still close to them today. Fourth, the design of infrastructures like road and settlement follows the adaptation strategy after the eruption and tsunami in the past. Some old design still be found in the midst of newly developed infrastructures which ignore this old knowledge. Fifth, the communitarian model of land tenure and economy is part of the social bonding created by community to integrate community as one community from past to future. Dangerous environment and the past experiences require the community to manage their economy, language, laws and land tenure as a total asset to tackle risk.

Overall, those things contribute separately and collectively to the maintenance of a clear understanding of the multiple hazards facing by Sangihe's community. This adaptation process cannot be operated in a short time, it takes generations in a conflicting and dynamic situation, and is not merely concerned with individual human considerations but also takes in social, economic and technological features. To keep this knowledge alive and practically maintained, the indigenous knowledge, science-based knowledge and local policy urged to work together and materialize it into a daily life and acknowledged in policies related to disaster and development.

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